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2017

Aalto , P K , Nyyssönen , H , Kojo , M & Pal , P 2017 , ' Russian nuclear energy diplomacy in Finland and Hungary ' , Eurasian Geography and Economics , vol. 58 , no. 4 , pp. 386-417 . <https://doi.org/10.1080/10.1080/15387216.2017.1396905>

<http://hdl.handle.net/10138/308056>

<https://doi.org/10.1080/15387216.2017.1396905>

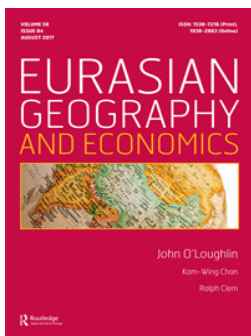
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To cite this article: Pami Aalto, Heino Nyysönen, Matti Kojo & Pallavi Pal (2017) Russian nuclear energy diplomacy in Finland and Hungary, Eurasian Geography and Economics, 58:4, 386-417, DOI: [10.1080/15387216.2017.1396905](https://doi.org/10.1080/15387216.2017.1396905)

To link to this article: <https://doi.org/10.1080/15387216.2017.1396905>



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Published online: 05 Nov 2017.



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Russian nuclear energy diplomacy in Finland and Hungary

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ABSTRACT

We compare Russian nuclear energy diplomacy towards Finland and Hungary, where the Russian state corporation Rosatom intends to build nuclear power plants by the 2020s. Russian nuclear energy diplomacy features Rosatom working with other state institutions, its own subsidiaries and an extensive network of companies and R&D actors to support Russian nuclear power projects abroad. Using the structuration approach, we find three interests driving such diplomacy: energy business and associated profits; modernization of the Russian economy, including the diversification of its export structure; while foreign policy interests are also involved, considering the constraints emerging in EU-Russia energy diplomacy in the oil and gas sectors, including the sanctions since 2014. Some domestic actors in Finland and Hungary make the linkage between nuclear energy and foreign policy as explicit as do some western commentators. Seeking to pursue these interests, Russian actors must accommodate their considerable assets to the structural constraints they encounter in the target countries. We identify four structural dimensions. The Russian actors are well endowed as regards the resources, technology, and infrastructure dimension; and the dimension of finance, business models, and markets. However, on the institutional dimension they face a less controllable environment. Regarding the ecological dimension, they must conform to local safety requirements. In both cases, Russian actors were able to strengthen perceptions of joint interests with actors in the target country facilitating the nuclear power plant projects, thereby paving the way for the use of soft power.

ARTICLE HISTORY

Received 14 August 2017
Accepted 23 October 2017

KEYWORDS

Russia; Finland; Hungary;
diplomacy; nuclear energy;
structuration

Introduction

The energy diplomacy pursued by Russian political and business actors throughout Eurasia and beyond is a frequently examined subject. Existing research focuses on negotiations on the development of new fields, pipelines and terminals, supply

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contracts, and delivery prices of Russian oil and natural gas (e.g. Shadrina 2014) and on institutions, agreements, and disputes between Russia and its customer countries (Belyi 2015; Romanova 2016). Further studies analyze how the market entry of shale oil and gas from United States fields has intensified the competition for Russian exporters (Kropatcheva 2014). However, the political and economic sanctions imposed by the EU and several other states in Europe, America, and Asia since Russia's annexation of the Crimea from Ukraine in 2014 hamper the energy diplomacy of Russian actors (Aalto and Forsberg 2016). This "hard power" facet of Russian foreign policy fuels distrust, reinforcing the realist-geopolitical reading of energy issues being inseparable from Russian foreign policy (Dannreuther 2016; Hadfield 2016). It is here that nuclear energy diplomacy emerges as a more "soft power" facet of Russian actions, resulting in commercially attractive agreements on the delivery of nuclear power plants (NPPs).

Russian energy diplomacy in the nuclear power sector has been little examined, although nineteen countries in Asia, Europe, and Africa have recently signed agreements with Russian parties on the construction of NPPs or supply of nuclear fuel, or have such cooperation ongoing. Currently over one-quarter of globally ongoing civilian nuclear power projects makes Russia and its state corporation Rosatom – with over 350 subsidiary companies – the largest provider in this strategic market. In 2013 Rosatom had contracts worth US\$66.5 billion in this roughly US\$500 billion market and intended to triple its sales by 2030 (David 2014). In 2016 its contract portfolio reached US\$100 billion (De Clercq, Burmistrova, and Stubbs 2016). Such volumes of trade require proactive diplomacy mobilizing the state and a network of actors to support the operations of Rosatom abroad. Some western observers note that this may increase Russian influence and alter the international balance of power (David 2014; Armstrong 2015; De Clercq, Burmistrova, and Stubbs 2016). Since the late 2000s Russian foreign policy and energy diplomacy have indeed become more assertive, notably toward the former Soviet Union area (Casier 2016). However, in the key EU markets, Russia combines "geopolitical" approaches to the conduct of diplomacy with legalistic and technocratic ones (Romanova 2016). These nuances are sometimes lost in the EU energy debate, where perceptions of dependence on Russian energy supplies have become more alarmist owing to price peaks and discussion being shaped by some Central and Eastern European (CEE) Member States with troubled historical legacies vis-à-vis Russia (Casier 2016). For example, several CEE states, in particular the Baltic states and Poland, have criticized the planned Nord Stream-2 natural gas pipeline from Russia to Germany through the Baltic Sea, drawing support from Denmark. The European Commission, also critical of the project, in June 2017 requested a mandate to negotiate on the matter on behalf of the Member States.

In this article we pursue a balanced analysis free from any alarmism. To parse out the various aspects that can be related to Russia's NPP exports, we first systematically examine the interests driving Russian nuclear energy diplomacy and then the structures within which Russian actors seek to promote those interests

in the target countries. Our scope is limited to civil nuclear energy. Although most of Rosatom's international projects are in Asia, we focus on two cases in the EU; namely, Finland and Hungary. This focus is relevant for several reasons. First, we cover Rosatom's two major NPP supply agreements in the EU – one in an “old” EU Member State (Finland) and the other more recently acceded (Hungary).¹ Finland and Hungary contracted new NPPs from Rosatom in 2013 and 2014 respectively, both scheduled to start operation in the 2020s. Second, the two countries have extensive energy trade with Russia and Soviet-supplied NPPs. Third, nuclear power is crucial for both, accounting in 2014 for 35% of domestically produced electricity in Finland and for 53% in Hungary (World Nuclear Association [WNA] 2016). Fourth, the contracts not only provide a key EU-area reference for Rosatom's international activities but also represent a diplomatic triumph for Russia. The diplomatic gains are significant in view of the EU's sanctions against selected Russian actors in which Finland and Hungary also participate.² In the case of Finland, the contract also goes against the tide in the wider geostrategic context, where the country is intensifying its cooperation with the NATO military alliance and where the Russian parties react negatively to the re-activated debate on possible future NATO membership, in view of the two countries sharing a border.³ Fifth, Finland and Hungary are interesting inasmuch as they are legally bound by the EU competition rules governing energy projects and politically committed to the target of the Energy Union of reducing dependencies on large external suppliers (European Commission 2015a). As such, they are part of an integrating energy market promoting liberalization to enhance competition, whereas Russia retains control over most of the energy sector (Dannreuther 2016), with some competition in the electricity market (Aalto et al. 2012).

In short, the Finnish and Hungarian cases typify the mixture of historically developed bilateral energy cooperation and contemporary multilateral structures of EU-Russia energy relations with mounting tensions and the two parties on different market development trajectories. We hereby ask (1) which interests drive Russian nuclear energy diplomacy in the cases of Finland and Hungary, and (2) to what extent can Russian actors realize their interests in these two cases. Our comparison seeks to assess the balance between the assets Russian actors possess and the structural constraints they encounter in the pursuit of their interests. We aim thereby to provide a firmer basis for further research and debate on Russian nuclear energy diplomacy. Alongside case-specific features, we will also address EU-level legal obligations and commitments. Our main focus will be on the conduct and room to maneuver of Russian actors rather than on the policies of the EU, Finland, or Hungary per se.

In the second section of this article we survey the existing research. In the third section, we discuss our methodological solutions, including our conceptualization of Russian actors, their interests, and the structures encountered in operations abroad. In the fourth and fifth sections we examine the conduct of Russian actors before presenting our conclusions.

Russian nuclear energy diplomacy: What do we know?

Existing research is scarce and does not address what nuclear energy diplomacy might mean on the conceptual plane or specifically in the Russian context. In a rare systematic study, Stulberg (2007) found that the predecessor of Rosatom, the Federal Agency on Atomic Energy, succeeded in promoting nuclear energy agreements with Kyrgyzstan and Kazakhstan by widening the range of choices of the target countries. To this end, it offered joint ventures, asset swaps, and extension of trade relations to other segments and products. Even though foreign policy interests were involved, Russian actors made strategic compromises when required to pursue business interests.

Kurtov (2010) situates Russian nuclear energy diplomacy in the context of global competition for oil and gas due to the high prices of the mid-2000s that amplified the potential of nuclear energy. He also mentions how the Russian activities in constructing the Bushehr NPP in Iran led to controversies with the US and NATO (Kurtov 2010). In this context, Rosatom's contract for an NPP in Akkuyu, Turkey, in May 2010 was significant given that Turkey is a NATO member with special ties to the United States and supported the bid by Russia to become a "global leader in nuclear power plant construction" (Sotnikov 2010).

Lowry (2016) notes how civil nuclear power technology is indeed one of the strategic high technology industries supported by the Russian state as part of a developmental agenda. At the same time, Oxenstierna (2014) implies that the Russian business and developmental interests presuppose assuming a strong role in international cooperation on nuclear safety and security issues, especially in the aftermath of the Fukushima nuclear disaster of 2011.

There are no systematic studies on Russian nuclear energy diplomacy towards the EU, Finland, or Hungary. Yet we know that in the Finnish domestic debate, the pro-nuclear lobby framed the 2013 contract with Rosatom in terms of the decarbonization prospects of nuclear power. The Finnish actors moreover expressed an interest in security of supply by stressing how building a modern plant would reduce the need to buy electricity from Russia (Syrjämäki, Kojo, and Litmanen 2015; Ylönen et al. 2015).

Methodological solutions: How to approach Russian nuclear energy diplomacy

Our main methodological solution is to apply the structuration approach, causing us on the one hand to study the interaction among Russian actors and their interests, and on the other, the structures shaping their operations abroad. The constraining and enabling qualities of these structures are modeled in terms of policy environments with four analytically distinguishable dimensions (Aalto et al. 2012).

Actors

Russian nuclear energy diplomacy is a coordination exercise involving several actors. The state is the formal leader: the President, his administration, and the relevant ministries, and agencies. In practice, Rosatom is the most engaged Russian actor. It is a strategic, vertically integrated, and fully state-owned enterprise with wide-ranging responsibilities and several subsidiaries.

Rosatom explores uranium deposits, produces nuclear fuel commodities by means of conversion and enrichment, designs reactors and power plants, and offers other technological solutions, also operating the plants. In 2015 Rosatom provided for 18.6% of Russia's electricity supply, aiming at 25–30% by 2030 and 45–50% by 2050 (WNA 2015). Nuclear safety, storage, and the management of spent nuclear fuel and radioactive waste are also among Rosatom's functions. Rosatom not only seeks global technological leadership (Rosatom 2015a) but also participates in international cooperation regarding the peaceful uses of atomic energy and the nuclear non-proliferation regime.

Rosatom coordinates a large network of engineering, infrastructure, and construction companies, as well as scientific and R&D actors, many of which receive state funding. In these networks, individuals can circulate from one company to another or between companies and state institutions (Tikkala 2016). Rosatom moreover operates technology parks and finances innovations. Its eligibility to receive financing from the state is a crucial asset in this capital-intensive high technology business (Lowry 2016).

Interests

A balanced assessment of these actors' combined actions requires us to examine what they are after. We identify three main interests for the state, Rosatom, and its networks driving their interaction with Finnish and Hungarian actors.

First, the Russian actors share an interest in energy business and profits. This interest pertains to the international nuclear energy market that the US Department of Commerce expects to grow from US\$500 billion to US\$740 billion over the next decade. The profits not only drive the management of the companies involved, but also support the fiscal interests of both the Russian Federation and the regions through the numerous Rosatom subsidiaries (see Table 1). The Russian government's 2008 Concept of Long-Term Socio-Economic Development until 2020 names high technology industries as a major driver of future economic growth. However, high technology so far accounts for only 3% of GDP, including the nuclear energy sector. Yet the potential is considerable since Russia has economies of scale in this area and the lowest costs in the world for uranium enrichment (Lowry 2016). The national program "Development of the Nuclear Power and Industry Complex" targets a 53% growth in overseas revenues by 2020 and a 14.9% growth in the industry's contribution to the volume of GDP (Government of

Table 1. Main subsidiaries of Rosatom in the Finnish and Hungarian cases.

Subsidiaries	Role
JSC Atomenergoprom (JSC AEP)	The Rosatom subsidiary holding company for civil nuclear energy that includes power plant operator Rosenergoatom; nuclear fuel producer and supplier TVEL; uranium trader Tenex; equipment supplier Atomenergomash; and overseas nuclear builder Atomstroyexport
Rosenergoatom Concern OJSC	A Rosatom and Atomenergoprom subsidiary responsible for operating the NPPs and selling the power generated
TVEL Fuel Company	A Rosatom and Atomenergoprom subsidiary responsible for nuclear fuel assemblies, production, and supply of nuclear fuel to Russian NPPs and abroad. In 2013 TVEL along with Rosatom drafted the nuclear supply agreements with Finnish and Hungarian actors
TENEX (Techsnabexport)	A Rosatom and Atomenergoprom subsidiary responsible for uranium conversion or enrichment services and for exporting nuclear fuel
JSC Concern Titan-2	An engineering company responsible for site preparation, construction, and installation work, as well as development of design and supply of all the required material and equipment
Atomenergomash Group (AEM Group)	A Rosatom, Atomenergoprom, and TVEL subsidiary responsible for equipment design, production, delivery, installation, and maintenance for nuclear as well as conventional power plants
JSC Atomproekt ^a	An engineering company designing NPPs and providing them with modern computer-based instrumentation and control systems
JSC Nizhny Novgorod Engineering Company (JSC NIAEP) <<Atomenergoproekt>> ^b	An engineering company that designs, constructs, and puts into operation power facilities in Russia and implements projects abroad. Also provides them with modern computer-based instrumentation and control systems
JSC Atomstroyexport (JSC ASE)	A key foreign trade engineering company responsible for the construction of nuclear power facilities abroad; since 2012, working with JSC NIAEP for the implementation of its projects as a part of the integrated company JSC NIAEP-JSC ASE
OKB Hidropress	A subsidiary of Rosatom responsible for designing the equipment and systems intended for power and nuclear industry
RAOS Project Oy	A Finnish subsidiary in charge of the nuclear reactor supply to the Hanhikivi-1 NPP
RAOS Voima Oy	A Finnish subsidiary representing Rosatom with 34% in the Finnish Fennovoima, a private company building the sixth NPP unit in Finland

^aThe St. Petersburg division of Atomenergoproekt together with VNIPIET Lead Institute became parts of Atomproekt. This subsidiary handles both the Hanhikivi-1 and Paks-2 reactor construction contracts (Atomproekt 2014).

^bThe Nizhny Novgorod Design Institute merged in 2012 with Atomstroyexport (ASE) in order to bolster ASE's engineering capability and enhance the competitive capacities of both companies. From 2014 it became the parent company of Atomenergoproekt (AEP). The reasoning behind this merger was to consolidate Russia's nuclear power engineering expertise into a single division. AEP has three divisions: in Moscow, in Saint Petersburg, and in Nizhny Novgorod. The Nizhny Novgorod division and the Moscow division of AEP are under the executive control of the NIAEP-ASE (WNN 2014).

the Russian Federation 2014). The energy business is also a significant employer. If we assume that each US\$1 billion in exports leads to some 5000 domestic manufacturing jobs (David 2014) and that Rosatom's exports will triple from 2013 as the

company expects, the number of skilled employees in this sector would grow from some 300,000 to almost a million (Government of the Russian Federation 2014).⁴

Second, the nuclear energy business helps to promote Russia's wider socio-economic interests in the form of the modernization of the economy and diversification of its export structure. The Russian economy is locked into resource revenues from oil and natural gas (Gaddy and Ickes 2013). Russian energy policy planning seeks to reduce this dependence. Instead of taking fossil fuel resources as the main vehicle of development, it identifies the energy sector overall as an infrastructure to be developed (Ministry of Energy of the Russian Federation 2014). This implies that Russian economic policy is taking a more developmentalist direction. The state actively supports high technology industries and R&D in areas in which Russia continues to enjoy competitive advantage as a legacy of the Soviet era. Rosatom is one of these national champion companies. Since its reform in 2007, Rosatom has increased its investments in R&D sevenfold, the annual rate being relatively high at 4.5% (Lowry 2016). The nuclear industry can help to further diversify the economy and exports by generating demand for products and services in engineering, the steel industry, geology, and construction. The NPP projects abroad have such wide-ranging modernization potential by virtue of Rosatom using several Russian contractors.

Third, the interest of the state in foreign policy influence also shapes the activities of Rosatom abroad. Some western commentators think Russian-built NPPs function like embassies (Armstrong 2015). Owing to the respective long-term contracts, they increase political cooperation with the host countries (see Sputnik News 2015). For some, these projects are "firmly on the Russian President's agenda"; therefore, "while nuclear power exports have both commercial aspects and modernizing arguments supporting them, their strategic and political value is also undeniable" (Martikainen and Vihma 2016). The Russian Foreign Policy Concept of 2013 states more neutrally that one of the basic goals of foreign policy is "strengthening Russia's positions in the global trade and economic system, providing diplomatic support to national economic operators abroad" (Ministry of Foreign Affairs 2013). To this end, Russia "works to create favorable political environment to diversify Russia's presence in global markets through the broadening of its exports nomenclature and of the geography of its foreign economic and investment relations" (2013). At the same time, Russia's National Security Strategy of 2016 mentions somewhat bleak economic prospects and identifies the sanctions as an impediment to diplomatic efforts to remedy the situation (Kureev 2016). Although official strategies remain ambiguous on the connections between foreign policy and energy (or even more so for nuclear energy), scholarly analyses frequently link the two. However, as discussed below, we should not equate them in a traditional geopolitical fashion but need more nuanced analysis in the EU-Russian context in particular (see Dannreuther 2016).

Such detailed analysis must acknowledge how Russian actors pursue their interests in an interactive context where their counterparts' "readings" or interpretations

of these Russian interests are decisive. Borrowing from Feklyunina (2016), the energy business and profit interests, for example, may be pertinent not only for Russian actors, but also for actors in the target country. If so, a degree of collective identity prevails between the two parties. Such a compatible understanding of “our” joint interests opens a window of opportunity for Russian actors to exercise “soft power” making certain outcomes more likely than others; for example, facilitating agreements on NPP projects. How we see the pursuit of Russian interests is always a subjective and context-dependent exercise. Russian actions can be associated with hard power qualities if perceived to have been imposed or with soft power qualities if perceived as a shared property of the parties.

The three interests we discern are also interrelated and as such may be mutually supportive or incompatible. The weight of each interest varies. Actors may pursue them explicitly or implicitly. We can now hypothesize that the extent to which the Russian actors can further their interests in nuclear energy diplomacy is a case- and context-specific question. The realization of the interests depends on the balance between the assets Russian actors possess and the constraints of the structure in which they conduct their operations. We will model the structure in Finland and Hungary within the concept of the policy environment. It includes four dimensions shaping the way in which Russian actors can further their interests.

Policy environments

Russian nuclear energy diplomacy encounters various policy environments in individual EU Member States. The main principles of the Energy Union – energy security, competitive market, energy efficiency, de-carbonization, and R&D (European Commission 2015a) – set the overall policy framework for nuclear energy. The Euratom Treaty of 1957 sets a 20% limit on the supply of uranium to nuclear power plants from a single external source and stipulates cooperation on nuclear research, safety, and security (Maltby 2013). The markets principle of EU energy policy requires the use of a competitive process for the contracting of nuclear power plants. Apart from these provisions, the EU lacks an explicit nuclear energy policy. The Fukushima disaster further reduced the demand for such a policy (Talus 2013). While Germany is phasing out its NPPs and Sweden refrains from building any more, Finland, Hungary, Bulgaria, the Czech Republic, France, Lithuania, Poland, Slovakia, and the United Kingdom continue with their nuclear power projects (European Commission 2017a).

Alongside this generic EU policy framework, Russian actors must meticulously analyze the national policy environment in which they wish to operate. We suggest starting this analysis from the resources, technology, and infrastructure dimension. Russian actors can shape this dimension decisively. In 2014, 18% of uranium supplied to the EU came from Russia (WNA 2015). The Russian firm JSC TVEL has a near-monopoly over fuel supply for the VVER-440 reactors in the EU (Viček 2016). The VVER-440 units are the first type of the VVER family and number altogether

14 units in the EU, including the existing reactors in Hungary and two out of four operative reactors in Finland. Today they utilize exclusively Russian fuel. However, during the period 2001–2007, the US-based firm Westinghouse supplied the two reactors in Finland (WNA 2016). Rosatom has advanced nuclear reactor technology, and, as a fully integrated company, can together with its network supply the full infrastructure of its NPPs.

The second dimension concerns finance, business models, and markets. Here Russia's competitive advantage includes low production costs of uranium and nuclear fuel, as well as state finance for NPP projects that its direct competitors – the French Areva, Japanese Mitsubishi, and Westinghouse (the majority of which is owned by the Japanese Toshiba) – cannot offer. Areva and Westinghouse experienced serious financial difficulties in the 2010s, and in March 2017, Westinghouse filed for bankruptcy. The German firm Siemens announced in 2011 its intention to leave the NPP supplier industry. The other German companies E.ON, EnBW, and RWE, together with Vattenfall's nuclear energy subsidiary, are also gradually downsizing their operations. Rosatom has several business models ranging from a turnkey model to a build, own, and operate model. It expects customers to value the constant “base-load” power supplied by the final plant, offsetting the potential market pitfalls of weather-dependent generation of solar and wind power that is rapidly entering the markets with its near-zero production costs and, in many cases, subsidies.

The institutional dimension is where Rosatom faces more constraints. It had to give assurances that its Akkuyu NPP project in Turkey would continue when threatened by Russian and Turkish foreign policy interests following the downing of a Russian fighter jet by Turkey in December 2015. In Finland and Hungary, Russian actors must convince formal institutions such as governments, relevant agencies, and parliaments. They must undergo the national licensing process and conform to the interpretations of the EU regarding permitting and competitive procurement. Russian actors need to factor in the informal institutions in the target country shaping expectations and acceptability. At the same time, they have to optimize support from the political institutions of Russia without over-politicizing the projects. This is challenging: Russia's use of hard power in Georgia in 2008, then in the Crimea, and its involvement in eastern Ukraine all caused concern. Likewise, the use of soft power through governmental and quasi-governmental institutions such as the Russia Today news agency, as well as other technological and civil society tools as outlined in the Russian Foreign Policy Concept of 2016, also caused concern (Mäkinen 2016). The constraint Russia encounters here is how its soft power actions may be interpreted as a challenge to established order, triggering perceptions of a “revisionist” Russia (Rutland and Kazantsev 2016).

Finally, with an eye to the ecological dimension, Rosatom offers solutions responding to the self-imposed de-carbonization policies the EU Member States agreed upon in 2014 of a 40% reduction in CO₂ emissions by 2030 from the 1990 level. At the same time, the projects must undergo environmental impact

assessments to satisfy national and local ecological requirements. In safety issues, Rosatom still suffers in the EU markets from the specter of the 1986 Chernobyl nuclear accident. Regarding nuclear waste management, Finland and Hungary expect their national commissioning companies to arrange the storage and final disposal of spent nuclear fuel, although Rosatom could also offer such services, including reprocessing.

Having conceptualized the actors, their interests, and the four dimensions of the policy environment within which they conduct the NPP projects, we can now define Russian nuclear energy diplomacy. It concerns international interaction by a network of Russian actors to accommodate various interests ranging from energy business to modernization and foreign policy influence in the sphere of exports of nuclear power plants and related solutions (Figure 1).

Data sources

We will use documents published by state and company actors in Russia, Finland, Hungary, and also by the EU; reports of intergovernmental organizations and NGOs; and likewise, statistics, news items, and opinions. Our analysis also draws upon seven interviews conducted in late 2014 with Russian experts in international relations and energy policy. For both Finland and Hungary, we will first outline the historical background of nuclear energy relations with Russia and then analyze

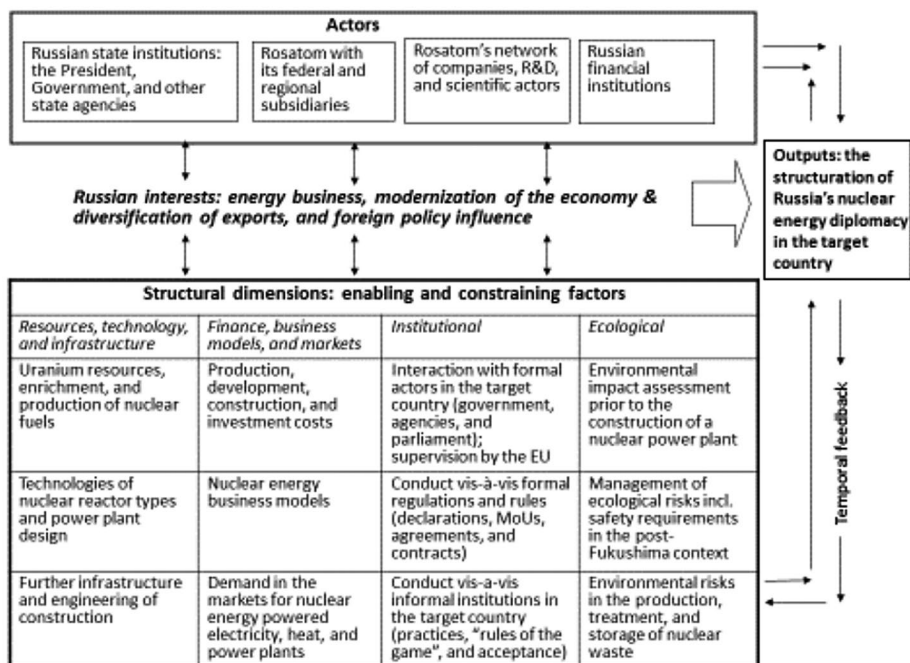


Figure 1. Actors, interests, and structures in Russian nuclear energy diplomacy.

the conduct of Russian actors with regard to each of the four dimensions and the respective interpretations by the Finnish and Hungarian parties.

The realization of Russian interests in the case of Finland

In 2015, 34% of the electricity produced in Finland was from nuclear power, 45% from renewables (mostly hydropower and biomass), 12% from coal, and 8% from natural gas and other non-renewable sources; altogether 21% of the electricity consumed was imported (European Commission 2017b). The share of Russian electricity imports varies depending on the market situation. In 2015 the share of Russian imports, including fuels, in the final consumption of energy was 45% (Tilastokeskus 2016).

Finland's first NPP in Loviisa has two Soviet-type nuclear reactors. Furthermore, all spent nuclear fuel produced in this NPP was transported to the Soviet Union/Russia during the period 1981–1996. The acquisition of the first units was highly politicized in the 1960s and 1970s. Although initially the West German reactor type was preferred, due to political pressure from Russia the final contract was signed with the Soviet V/O Technopromexport (Sunell 2004; Michelsen and Särkikoski 2005). Ever since, Russian suppliers have offered reactors in response to Finnish tenders, but have lost. Rosatom also lost in the bidding process in 2009 for Finland's sixth nuclear reactor to the German E.ON. When E.ON withdrew in October 2012 in the aftermath of the Fukushima disaster, the Finnish commissioning company Fennovoima downsized the plan and chose Rosatom's AES-2006 1200 MW reactor.

The resources, technology, and infrastructure dimension

In addition to the contract for a reactor, in 2013 Rosatom's subsidiary, JSCTVEL, won a contract to supply nuclear fuel for a plant called Hanhikivi-1. Due to a 10-year fuel contract, Fennovoima had to address concerns expressed in the Finnish Parliament about excessive dependence on Russian resources (e.g. Pohjanpalo 2014). Fennovoima (n.d.) responded that the contract conformed to the EU's energy security provisions.

Rosatom also expanded its business interests toward electricity sales by becoming a 34% owner of Fennovoima through its subsidiary RAOS Voima Oy (see Table 1). For Rosatom (2013), these contracts signified "the year of many Russian victories in important nuclear power plant construction tenders abroad."

The Hanhikivi-1 project also promotes interest in the modernization of the Russian economy and the diversification of its export structure by showcasing Russian nuclear technology. This was important in view of the Fukushima accident. Fennovoima stated that the plant "corresponds with IAEA and European Utility Requirements (EUR), and for licensing purposes it will be adapted to be in accordance with Finnish national safety standards" (Fennovoima 2013a). However, in October 2016 Fennovoima had to concede that Rosatom had experienced serious

delays in producing the documentation for a construction license (Myllykoski 2016). Rosatom therefore considered switching the reactor supplier from RAOS Project to Atomstroyexport (Iltalehti 2016).

The selection of Russian companies JSC Concern Titan-2, Atomenergomash, OKB Gidropress, and Atomproekt as the main subcontractors for infrastructure further served Russian business and modernization interests. To consolidate the joint business interest with Finnish actors, Titan-2 chose 10 Finnish subcontractors (Rosatom 2015a; Titan-2 2016.)

The financial, business models, and markets dimension

The cost estimate of the project is €6.5 to 7 billion, €1.7 billion of which is to be covered by the Finnish and Russian owners' capital. To cover the rest, JSC Rosatom Overseas will arrange debt financing of €4.8 to 5.3 billion for Fennovoima. Part of the loan (€2.4 billion) is to come from the Russian National Wealth Fund (Fennovoima 2015a). On the one hand, the Russian state investment supported the business interests of Rosatom by affording it a competitive advantage, and on the other, it served as a constraint owing to the consequent suspicions of the foreign policy implications of such an amount of Russian capital in Finland. The government of Finland therefore imposed a minimum 60% Finnish or EU-area ownership requirement for further licensing for construction (The Council of State 2014; Syrjämäki, Kojo, and Litmanen 2015), thus thwarting Rosatom's wish to increase its share of Fennovoima up to 49% (Kokkonen 2014). Voimaosakeyhtiö SF, with a 66% holding represents the Finnish actors and, according to the shareholders' agreement, should continue to be the majority owner of Fennovoima.

Fennovoima fulfilled the government's 60% requirement when the majority state-owned electricity company Fortum announced immediately before the parliamentary vote on Fennovoima's application its interest in investing a maximum of 15% in Fennovoima, raising speculation about political pressure. The business interest of Fortum was to facilitate the acquisition of hydropower assets from Gazprom in Russia in collaboration with Rosatom and to support its existing investments in Russia. As the rearrangements regarding Russian hydropower assets were incomplete, Fortum postponed its investment decision on Fennovoima (Fortum 2014, 2015a; Syrjämäki, Kojo, and Litmanen 2015).

In this connection a small Croatian company, Migrit Solarna Energija, emerged as an investor (Fennovoima 2015b), only for the Finnish Ministry of Economic Affairs and Employment (MEAE)⁵ to find the company to be a front organization connected with Russian actors. The credit arrangements of the Russian state-owned Sberbank on Migrit conflicted with the precondition for 60% EU-area ownership (MEAE 2015). Fortum eventually acquired a 6.6% share in Fennovoima (Fortum 2015b). The partly state-owned stainless steel producer, Outokumpu, also increased its share of the finance. As Fortum is a potential competitor of Fennovoima through its ownership in the country's third, fourth, and fifth nuclear

reactors, the result is somewhat awkward. This evoked debate in Finnish society on whether the Russian state had persuaded Finnish state authorities to perceive foreign policy interests in good-neighborly relations to be at stake, thus requiring partly state-owned companies to join the project.

To dispel some of these worries, Rosatom directed attention to joint Finnish-Russian business interests. In light of our approach, this paves the way for the application of soft power. In addition to the project entry of Fortum and Outokumpu, the plant supplier Rusatom Overseas, and the main contractor, Titan-2 concluded a project management agreement with SRV (2015; see also Table 1), a Finnish construction company operating in Russia, in return for the latter's financial commitment to Fennovoima. Rosatom welcomed the support from the Finnish government and new shareholders, promising to guarantee "compliance with budgets and contract terms" and "provide the most reliable technology" (Rosatom 2015b). President Putin praised the Finnish Parliament for its difficult decision to support the project, which, according to him, was beneficial to the Russian economy and a good investment by the Russian National Wealth Fund (President of Russia 2015). However, by autumn 2016, the Russian Ministry of Finance was reconsidering the infrastructure commitments of the fund to finance the gaps in the Russian budget (Papchenkova 2016).

As a shareholder in the prospective electricity seller Fennovoima, Rosatom could also point to common interests with Finnish actors regarding the plant's integration into the Finnish (and northern European) power market. First, electricity consumption was set to increase (MEE 2014a; The Council of State 2014), creating demand for the plant's electricity. Second, while Hanhikivi-1 would serve the Finnish interest in reducing dependence on Russian electricity imports, it would also have an important role in balancing markets in peak consumption situations. Third, nuclear new build would respond to market demand for de-carbonized electricity. Fourth, it would allegedly decrease electricity prices.⁶

The institutional dimension

To pursue its business, Rosatom will have to pass a three-step Finnish licensing process. In 2014 it passed the first hurdle. However, because Rosatom was not mentioned as the reactor supplier in the positive decision-in-principle of 2010, the Finnish MEAE required Fennovoima to supplement its application. The Green Party of the government coalition deemed the changes in reactor type and output to require a new application. Moreover, the government program, negotiated in the aftermath of Fukushima, included a moratorium for any new decisions-in-principle for nuclear power. The Greens linked the project to Russian foreign policy interests by criticizing the government heavily for "Finlandization" (pre-emptive accommodation of Russian interests), which our approach treats as an instance of Russia using soft power, whereas in the Cold War era the phrase referred to efforts to deter the specter of Russia using hard power. The project also allegedly violated

the objective of reducing dependence on energy imports in the EU Energy Union (Hautala and Jávör 2014; Milne 2014). The Green Party decided to resign from the government and the Finnish Parliament approved the amended application (Syrjämäki, Kojo, and Litmanen 2015).

The second step in Finland is the construction license. To this end, Fennovoima will deliver documentation to the Finnish Radiation and Nuclear Safety Authority STUK for the safety assessment in several phases (Fennovoima 2015b). Before being caught up in delays itself, Rosatom criticized Fennovoima for slow handling and submission of these documents and was concerned about possible delays in licensing (Paananen 2016). STUK had its own concerns regarding the safety culture of Fennovoima (Toivonen 2016), and the regulator ordered an evaluation of that safety culture. The Finnish media also rightly foresaw that the application process for the construction license would be delayed (Akimo 2017).

In 2014 then-Prime Minister Alexander Stubb stated that the project "...should not be mixed with politics" (Tass 2014). However, in 2016 the Finland's Ministry of Foreign Affairs (2016) had several reservations. These were due to loss of image among the EU partners owing to the role of Rosatom as a state company, when the European Union was seeking to reduce dependence on Russian supplies. Criticism of Russian policies in the Crimea and eastern Ukraine, the effect of sanctions on the financing of the project, availability of spare parts, components, and nuclear fuel, likewise the ability of Fennovoima to sustain the 60% EU area ownership during the lifetime of the plant were a part of the concern. The third phase of licensing will be the operating license.

The role of Rosatom as a state company influenced acceptance by society. According to an opinion poll, 46% of Finns wanted to postpone the project, 17% wanted to abandon it altogether, 30% to continue it, and the remainder were undecided (Vehkaoja 2014; see also Arola 2014). To ensure local acceptance in the host municipality of Pyhäjoki, Fennovoima organized events for stakeholders, sponsored activities for young people and sports, and also promised jobs and opportunities for local companies (Jussila and Sipola 2014; Rosatom 2015b; Titan-2 2015; Kaleva 2016).

The ecological dimension

Rosatom encountered a relatively favorable policy environment in the Finnish case as regards the ecological dimension. The project was compatible with Finnish and EU climate policy and de-carbonization targets. The government of Finland deemed the overall environmental impact reasonable when weighed against the benefits. However, the Ministry of the Environment disagreed, claiming that the project might well delay domestic investments in renewables, citing the risks of reactor accidents and deficiencies in nuclear waste management (The Council of State 2014).

With Rosatom as the reactor supplier, Fennovoima had to update the Environmental Impact Assessment (EIA) report (Syrjämäki, Kojo, and Litmanen 2015). The updated report concluded that in relation to the originally intended 1800 MW plant, “the impact of radioactive emissions will be of roughly the same magnitude” (Fennovoima 2014).

To support the Russian interest in modernization and diversification of exports, Rosatom needed Hanhikivi-1 as an international reference. It therefore needed to fulfill the nuclear safety standards in Finland. In 2012 Rosatom recruited the retired Director General of STUK, Jukka Laaksonen, as Vice President in Rosatom Overseas. According to Rosatom (see Atomenergoprom 2012), the recruitment “speaks of how much importance we attach to the effectiveness and safety of our projects.” In the preliminary safety assessment, STUK (2014a, 2014b) required revisions to meet the Finnish requirements. Further criticism from neighboring Sweden focused on the cross-border impacts of the plant.

By 2016, Fennovoima had not solved the problem of management of spent nuclear fuel. Posiva Ltd., which is building a final disposal facility for the existing NPPs, only agreed to collaborate by selling expert services, but not to share the facility. The Ministry of Economic Affairs and Employment (2014, 2016) deemed Fennovoima’s reports sufficient at that point and allowed it to continue the process of applying for a construction license. The government intends to decide on the application by 2019 (Table 2).

The realization of Russian interests in the case of Hungary

In 2015, 52% of the electricity produced in Hungary came from nuclear power, 19% from coal, 17% from natural gas, and the rest from renewables (mostly from biomass and wind power); however, altogether 38% of electricity consumed was imported (European Commission 2017b). In Hungary the share of nuclear power in the generation of electricity is the fifth largest in Europe after France, Slovakia, Belgium, and Ukraine (Index 2014). Hungary’s overall energy import dependence, 52% in 2013, was in line with the EU average, or high by Hungarian standards (European Commission 2015b; Ministry of National Development 2012). In 2012, 85% of oil, 79% of natural gas, and 100% of nuclear fuel were Russian imports (Ámon and Deák 2015). Since Hungary is land-locked, alternative suppliers of oil and natural gas are limited.

Soviet nuclear technology and Russian nuclear fuel supplies are indispensable to Hungary’s nuclear energy sector. Politically, Hungary belonged to COMECON and the Warsaw Pact, thus ordering a nuclear power plant from the West was practically impossible (Nyyssönen 2006). The town of Paks in southern Hungary is the site of four Soviet-supplied 500 MW VVER-440 reactors, operated by the fully state-owned MVM (Magyar Villamos Művek). In March 2009 the Hungarian Parliament made a decision-in-principle on the preparatory work for Paks-2, comprising two new units. In June 2012 the government made Paks-2 a high priority. The oldest

Table 2. Realization of Russian interests in the case of Finland.

Resources, technology, and infrastructure	Finance, business models, and markets	Institutional	Ecological
Rosatom's TVEL concluded a ten-year agreement with the Finnish commissioning private company, Fennovoima, for the provision of nuclear fuel to the Hanhikivi-1 NPP	€6.5–7bln cost estimate of which a €4.8–5.3bln loan to be arranged by the Russian parties; Finnish Government declined rejected further Rosatom investment by requiring 60% EU area ownership – to meet this criterion, the part-state owned Fortum acquired 6.6% as a “door opener” of a possible Joint Venture with Rosatom	After Parliament accepted Fennovoima's revised application for a decision-in-principle with Rosatom as reactor supplier, the Greens left the Finnish government in protest against the 2010 decision, criticizing the government for “finlandization” and warning of too close connections to Russian foreign policy interests	The project was compatible with Finnish and EU climate policy and decarbonization targets
The NPP is set to utilize the Russian VVER plant technology in view of the Fukushima accident to further the modernization and diversification interests of the Russian government; however, Rosatom suffered serious delays in producing the documentation for a construction license	Turnkey business model and prospective electricity sales business in the Finnish and Nordic markets as a part owner of Fennovoima, which set a maximum price of €50/MWh for the electricity the plant would start to produce in 2024. Several Finnish sub-contractors involved to cater for “joint interests”	Immediately after Fennovoima passed the first phase in licensing, it proceeded to apply for a construction license with documentation for safety assessment. However, this step was delayed because of disagreements among Rosatom, Fennovoima, and Finnish authorities on documentation	To support Russian interest in modernization and diversification of exports, Rosatom needed Hanhikivi-1 as an international reference; to achieve this it needed to fulfil the nuclear safety standards in Finland
Russian companies Titan-2, Atomenergomash, OKB Gidropress, and Atomproekt selected with Fennovoima's approval as the main subcontractors for infrastructure development, thus serving the Russian business and modernization interests	The agreement according to President Putin is beneficial to the Russian economy and a good investment by the Russian National Wealth Fund. However, this commitment was being reconsidered immediately owing to financing shortfalls in the Russian budget	Fennovoima and Rosatom had to convince Finnish society of the relevance of the project by organizing events for stakeholders, sponsoring activities for young people, and promising jobs and other opportunities to local companies	Fennovoima's reports deemed sufficient by the responsible ministry even with an unresolved final disposal arrangement for spent nuclear fuel; the company was allowed to proceed to applying for a construction license. The decision to the application is scheduled for 2019

two Paks reactors received a 20-year lifetime extension in 2012 and 2014 until the 2030s. The expansion of nuclear power takes place in the context of several cut-offs of natural gas deliveries to Hungary since the mid-2000s due to Russian-Ukrainian disputes (Ackermann 2014; Marnitz 2014). To decrease the risks of transit through Ukraine, Hungary supported the Gazprom-led South Stream pipeline project, which had collapsed by late 2014. The Hungarian debate then turned to possible Russian gas imports through Turkey (Népszabadság 2015a). Russian actors have consolidated their position in the Hungarian energy sector since the return to power of Prime Minister Viktor Orbán and his *Fidesz* Party in 2010.

The resources, technology and infrastructure dimension

Rosatom concluded the agreement for the Paks-2 NPP in Moscow in January 2014, in the presence of Rosatom CEO Sergei Kiriyenko, President Putin, and PM Orbán. The Nizhny Novgorod Engineering Company Atomenergoproekt (NIAEP-ASE) (see Table 1) is responsible for the engineering, procurement, and construction of two 1200 MW VVER AES1200 reactors, modeled on Hungary's existing reactors. They should be in commercial operation by 2025 and 2026, although the Environmental Impact Assessment mentions the years 2025 and 2030 (see MVM Erbe 2015).

Rosatom's subsidiary, JSC TVEL, originally concluded a 20-year exclusive nuclear fuel supply agreement with MVM, which was cut to 10 years after the Euratom Supply Agency and the European Commission intervened to ensure competition among fuel suppliers.

The position of Russian companies as the major subcontractors serves not only the business and profits interests of Rosatom, its network, and the Russian government, but also Russian modernization and the diversification of exports interest. In February 2015 the German Chancellor Angela Merkel promoted the interests of Siemens in the construction process (Magyar Nemzet 2015; Népszabadság 2014b, 2015b).

The financial, business models and markets dimension

The estimated cost of Paks-2 is €12 billion, including the supply of nuclear fuel. Rosatom initially committed to arranging a €10 billion loan, repayable by 2044, with the fully state-owned Vnesheconombank as the likeliest funder. The Hungarian side was to provide €2 billion, but in early 2017 President Putin raised his offer to cover the whole amount of the loan.⁷ According to Attila Aszodi, the state commissioner in charge of the expansion, the offer of finance made Rosatom preferable to Areva or Westinghouse (Than 2015). However, concerns emerged in Hungary of how a long-term loan from a Russian state entity to a Hungarian state entity might inadvertently serve Russian foreign policy interests at the expense of Hungary. The European Commission for its part scrutinized the Hungarian part of the financing regarding possible state subsidies but approved it after measures to control "undue distortions" of competition in the Hungarian energy market (European Commission 2017c; Népszabadság 2015e, 2016).

In the Hungarian case, Rosatom used a turnkey business model similar to that used in Finland and sought to accommodate Hungarian interests by transferring the plant to full ownership of MVM and by assuring domestic firms a 40% share in the construction processes. The Hungarian government furthermore expected the plant to generate up to 10,000 new jobs and reduce energy dependence (Lázár 2014).

However, contrary to its plans in Finland, Rosatom will not sell electricity in the Hungarian market. Becoming a market participant in Hungary may in fact

compromise the profit interests of Rosatom. In 2013 PM Orbán suggested that Hungarian electricity prices could become the lowest in the CEE in some four or five years (Index 2013). However, some observers deem such expectations odd given the investment costs of the new units, which should make consumer prices some three times higher to render the investments profitable (Sipos 2013). The government has based its legitimacy on low electricity prices and committed to *rezsicsökkentés*, meaning the reduction of utility bills and living costs. This was one of the key issues in the 2014 election campaign of the Orbán regime (Népszabadság 2014a; Kovács 2015). In practice, the government's policy of determining the price has led to *rezsiharc* (overhead war) with Brussels (Magyar Nemzet 2014). The opposition has supported more market-based mechanisms with the argument that low prices lead to higher consumption and delay investments in renewable energy.

Since 2014 a debate over electricity prices has gone on concurrently with emerging concerns about Russian foreign policy interests. Such intermingling of the dimension of finance, business models, and markets with foreign policy issues has become part of the policy environment Russian actors encounter in Hungary. Thus when President Putin visited Hungary in February 2015, he witnessed expressions of these concerns with demonstrators shouting slogans like "We will not be a [Russian] colony" (Népszabadság 2015a,c).

The institutional dimension

Rosatom was negotiating the Paks-2 agreement at a time when Hungary's relations with the European Union and the United States were cooling. Rosatom signed the 2014 agreement with Hungary after the Ukrainian President, Viktor Yanukovich, had accepted a deal with Russia instead of the long-negotiated association agreement with the EU. However, Rosatom concluded the agreement before the Ukrainian *Maidan* uprising led to his ousting from office and the European Union, the United States, and several other states imposed sanctions on Russia.

Unlike in Finland, Rosatom was not dealing with a nuclear power lobby consisting of industries and municipalities but with a government interested in retaining its domestic political power, making the Paks-2 agreement part of its electoral campaign. While in opposition, the *Fidesz* Party was critical of Russian influence. When in office and in the run-up to the elections, it allied its interests to stay in power with the interests of Rosatom and Russia (Lázár 2014). Our approach treats the emergence of such shared interests as a platform for Russian actors using soft power. Orbán's overwhelming majority enabling a powerful leadership similar to that enjoyed by President Putin for its part paved the way for Russian actors to focus any persuasive efforts required on only one group in Hungary. The supermajority enabled *Fidesz* to limit the parliamentary processing to just four days. The ruling party received support from the ultra-nationalist *Jobbik* Party, which has connections to Russia, but also faced espionage allegations (Népszabadság 2015f).

The agreement and its parliamentary approval resulted in institutional turmoil beyond the control of Rosatom or Russia. The first reactions of the opposition and the NGOs ranged from calls for a referendum to an extra session of the parliament (Népszabadság 2014b). In 2014 the green-liberal *Lehet Más a Politika* (LMP) protested against the parliamentary session by sounding a siren: they criticized the hasty parliamentary procedure and lack of access to background documents (ATV 2014), as did the former President of Hungary, László Sólyom. While Paks-2 was one of the most important decisions of the Orbán government, the opposition deemed the quality of political debate low, their own treatment unfair, and the whole procedure a violation of the order of the parliament (Tibor 2014). *Fidesz* framed the agreement with Rosatom in terms of national security and thereby justified the classification of the documents.

Eventually the President of Hungary, János Áder, ratified the bill in February 2014. By November 2014, the Russian Foreign Minister Sergei Lavrov had commended Hungary for not succumbing to “Russophobic approaches,” unlike some other CEE states in the EU (Than 2015). In 2015 the European Commission launched an infringement procedure against Hungary for suspected violation of the public procurement rules, but closed the case in November 2016. In the European Parliament, in addition to criticism of the state of democracy and freedom in Hungary, the Paks case raised doubts regarding the lack of public consultation, ambiguous energy security effects, and compatibility with European law (cf. Parliamentary questions 2015).

The Hungarian government effectively restructured some of the norms and practices in the country at the expense of transparency by classifying the details of the case for 30 years instead of the normal 15 years. The government justified this by fears about sensitive information being leaked to terrorists (Népszabadság 2015d). The LMP again adopted extra-parliamentary measures such as using megaphones and banners (Országgyűlési Napló 2015). The Russian and Hungarian governments completed the formalities by updating the 2001 intergovernmental agreement on nuclear energy (Soglashenie 2014).

Soon after the classification decision, in March 2015, the Hungarian Greens organized a hearing in Parliament (Daily News Hungary 2015). They compared the expedited procedure to that in Finland wherein Fennovoima negotiated on details for years, and questioned if the government was unaware of the EU Commission’s opposition to the initially agreed 20 years’ fuel supply monopoly. The leader of the Hungarian civic lobby *Energiaklub*, Ada Ámon, further criticized the government’s failure to publish any studies on the impacts of the Paks-2 project on the energy markets or prices (Hungary Matters 2015; Index 2015). Overall, for the government, the case depended on domestic interests in retaining political power by securing allegedly cheap energy. For the opposition, it compromised Hungarian foreign policy interests in committing the future of the country for decades to come. The opposition perceived the government to have been influenced by Russian use of soft power.

The ecological dimension

Vis-à-vis the ecological dimension, Rosatom negotiated with a government preferring centralized nuclear power production due to interests in security of supply, controlling costs, and meeting the decarbonization objectives agreed on at the EU level (Ministry of National Development 2012, 28–29). By contrast, some opposition groups preferred a more decentralized energy system based on renewable sources of energy. For example, the *Energiaklub* referred to Denmark, which by 2050 aims to achieve an energy system based totally on renewables (MTI 2015). The EU Commission also warned the Hungarian government of how the policy of maintaining low regulated prices might compromise the prospects of improving energy efficiency (Canton et al. 2013).

Rosatom and MVM had to modify some technical and safety features of the Paks-2 NPP after the publication of the EIA report in 2015 (see MVM Paks II 2016), which also evoked international criticism regarding the quality of the documentation (Nuclear Transparency Watch 2015). The environmental license granted in September 2016 was upheld against complaints in April 2017. The Hungarian Atomic Energy Authority (HAEA) granted the site and construction license in March 2017, which would enable building to start on time in 2018 (MVM Paks II 2016).

The HAEA is also responsible for safety and waste issues. Under the 1995 policy, spent fuel is stored in pools at Paks for five years and is then transferred to an interim (50-year) dry storage facility. For the long-lived intermediate-level and high-level wastes, a claystone formation in the southwest has been investigated. The construction of a long-term depository has been ongoing since 2012 (WNA 2017) (Table 3).

Conclusion

Russia has an abundance of energy resources attracting interest from a wide range of foreign governments and companies, enabling Russia to exercise active energy diplomacy. We used the structuration approach to scrutinize in more detail how Russian actors seek to take advantage of their considerable assets in the nuclear energy sector. However, our analysis stressed that Russian nuclear energy diplomacy has to serve several interests simultaneously while accessing foreign markets in the target countries. In the cases of Finland and Hungary, it faces the structural constraints ensuing from EU-level policy and the national policy environments. Our approach and research questions focused specifically on this difficult “fit” between the interests of the Russian actors with the features of the relevant policy environment. Regarding our first research question, each of the three interests we postulated is discernible in the two cases.

Rosatom pursued its joint interest with other Russian actors in the energy business and profits by offering a broadly similar technological solution for the Finnish and Hungarian contracting parties; that is, the same reactor type and agreements

Table 3. Realization of Russian interests in the case of Hungary.

Resources, technology, and infrastructure	Finance, business models, and markets	Institutional	Ecological
TVEL's 20-year exclusive nuclear fuel supply agreement with the MVM for Paks-2 cut by 10 years after Euratom Supply Agency and European Commission intervened on grounds of enabling competition	€12bln cost estimate including the supply of nuclear fuel; financial package consisting of Russian €10bln loan offer, repayable by 2044 with Hungarian finance of €2bln. An improved 100% financing offer by Russia in early 2017	Fast-track procedure for the agreement in the Parliament, criticized by the opposition for lacking democracy, transparency, and market forecasts; European Commission enquiry on grounds of competition law; criticism in the European Parliament	Rosatom and MVM had to modify parts of the technical and safety features after the publication of the environmental impact assessment report
NIAEP-ASE, a Rosatom subsidiary, responsible for the engineering, procurement and construction of two 1200 MW VVER AES 1200 reactors, modeled on Hungary's existing reactors	Heavy state involvement in the turnkey business model. Domestic firms assured a 40% share in the construction process to support the emergence of perceptions of "joint interests"	In 2014 intergovernmental agreement for cooperation on nuclear energy with the Hungarian government was signed before the Ukraine crisis and the sanctions	International criticism of the quality of documentation regarding safety issues
Infrastructure provision serves the business interests of Rosatom, its network, and the Russian government, while sub-contracting serves the wider Russian modernization and diversification of exports interest	Rosatom not to become market participant through the Hungarian Government promising low prices; opposition suspicious of the price promises and adverse effects for developing renewable energy and strengthening of Russian presence and possible foreign policy interests	Rosatom and the Government of Hungary faced acceptability concerns on the part of the Hungarian opposition, which also highlighted how the projects might inadvertently serve Russian foreign policy interests to the detriment of Hungary	Hungarian Atomic Energy Authority responsible for safety and waste matters; short-term and interim storage of nuclear waste from Paks available while construction of long-term depository in progress since 2012

for the supply of nuclear fuel and related infrastructure. To pursue this business interest, Rosatom was attentive to the case-specific constraints of the policy environment in these two cases. Stulberg (2007) found the same also to be true of Rosatom's conduct in Central Asia. In Finland and Hungary, Rosatom and its network supplied the technology and infrastructure on a turnkey basis. However, in Finland, Rosatom also sought further profits by becoming a co-owner and market participant in the Finnish electricity market connected further to Northern Europe. In the Hungarian case, where the Orbán government is keen to maintain low electricity prices and where profits are harder to make, Rosatom limits itself to a (potential) financier and plant supplier role. In both cases, a key asset of Rosatom was its offer of state-backed finance – in the Finnish case, it was decisive for the project to continue.

Russian interest in the modernization of its economy and diversification of its export structure was also equally discernible. Rosatom cultivated Soviet-era technological expertise by offering a new version of a tried and tested reactor design that was already to some extent familiar to the Finnish and Hungarian actors. This, too, constituted an asset for Rosatom when competing designs suffered from technological problems at sites ranging from Japan's Fukushima to Finland's badly

delayed fifth NPP unit built by Areva. Following a developmentalist economic model (Lowry 2016), the state-owned Rosatom backed by state funding and its network offered high technology products and services, generated sub-contracting for Russian companies, and hence helped to modernize parts of the Russian economy and diversify the export portfolio away from oil and gas.

The Russian state also furthered its foreign policy interests in both cases by reinforcing an established diplomatic relationship in the nuclear energy sector and extending its life for decades. These foreign policy gains are valuable in contrast to the constraints in wider EU-Russia energy diplomacy, in particular sanctions in the oil sector and controversies over gas supplies. Although Russian foreign policymakers commented favorably on the Finnish and Hungarian NPP projects, they were careful not to directly connect these to foreign policy influence. Yet such potential influence was discerned in the commentary by the Finnish Ministry of Foreign Affairs and groups opposing the projects in Finland and Hungary. While Russian nuclear energy diplomacy vis-à-vis Finland was conducted mostly through Rosatom and its subsidiaries to avoid politicization, in the Hungarian case it had a more open state-to-state character involving these countries' respective presidents in a high-level dialog.

The pursuit of Russian foreign policy interests also involves the use of soft power. In Finland, partly state-owned companies and firms with interests in Russia were persuaded to enter the Hanhikivi-1 project to reach the 60% Finnish or EU-area ownership criteria set by the government. After initial hesitations, the Finnish parties concluded joint interests with Russian actors to be at stake. In both countries, Rosatom's network was able to enhance such a perception by creating subcontracting roles and jobs for local firms. The foreign policy interests, however, remained more subtle than in the case of Rosatom's Akkuyu NPP project in Turkey. This project only regained its momentum once Russia and Turkey resumed diplomatic relations after the impasse over the downing of a Russian fighter jet by Turkey in 2015, following Turkey's failed military coup and subsequent domestic developments in the summer of 2016 that pushed Turkey further toward an outsider role in relation to the EU similar to that of Russia.

Our second research question concerned the extent to which Russian actors could realize their interests in the two cases. We found Russian actors adept at using their considerable assets on the dimension of resources, technology, and infrastructure. However, their record of balancing the assets and structural constraints on the dimension of finance, business models, and markets is more mixed. In both cases Rosatom made an attractive financing offer accompanied by a turn-key business model. Yet, in the Finnish case it was poorly informed on the political necessity of the 60% requirement for domestic or EU area ownership. It defended the entry as a project partner of a small Croatian company that the Finnish authorities ultimately deemed a front organization potentially utilizing Russian funding from a state-owned institution in place of EU-area financing.

In terms of the institutional dimension, in Finland Rosatom passed the first step required by Finnish law regardless of objections by the parliamentary opposition. In Hungary, Rosatom was strangely unaware of how the EU-level market regulation hampers the use of long-term supply contracts and had to wait for the Commission to rule on whether the planned financial package was compatible with EU law on state aid. Overall, Rosatom and its partners encountered fewer constraints in Hungary on the part of the domestic opposition than in Finland due to the Hungarian government effectively suppressing dissent. This, for its part, made Hungary a target of criticism in the European Parliament.

On the ecological dimension, Rosatom embarked on a learning process to improve its expertise by participating in the discussion Fennovoima had with the Finnish nuclear safety authorities. In Hungary Rosatom encountered similar criticism on safety and cross-border impacts as it did in Finland. Yet it benefited from the campaign launched by the government in 2015 stressing the de-carbonizing advantages of the Paks-2 project.

In summary, we find the heaviest constraints emerging for Russian actors on the institutional dimension. This shows how the energy sector has featured more regulation, policy measures, and scrutiny since the predecessor of Rosatom concluded the first agreements in Cold War Europe. At the same time, the nuclear energy diplomacy of Russian actors has managed to remove some institutional constraints by skillfully preparing the ground for the emergence of joint ventures and other interests. This has enabled Russian actors to use soft power to shape perceptions in the target country. Although this involvement of Russian foreign policy interests is milder and subtler than some western observers have warned, it is something Russia seeks when sanctions and lower prices for oil and gas make any gains harder to come by elsewhere than in the field of nuclear energy diplomacy.

Notes

1. Rosatom has examined the prospects of expanding its operations in Slovakia, while Bulgaria is looking to revive the Belene NPP project where Rosatom was the supplier before the agreement was canceled in 2012.
2. The nuclear energy sector is not directly subject to the sanctions as is offshore and Arctic oil; no Rosatom subsidiaries are under sanctions as of August 2017. However, the sanctions influence the nuclear energy trade and diplomacy indirectly. Access to long-term international finance and high-level political meeting is restricted, including travel and visa bans on some high-ranking political and business leaders (Aalto and Forsberg 2016).
3. For example, in May 2017, the US Air Force used Finnish airbases for NATO military exercises while in June 2016, NATO troops conducted a landing drill along the Finnish coastline.
4. As with other strategic industries in Russia, some observers expect that some of the actors in the networks involved seek personal business benefits since the ownership structures lack transparency (see e.g. Tikkala 2016). Although such informal networks may not be optimal for competition, they can be functional for unifying state and

business actors, helping them to distribute resources and ultimately, conduct business (Ledeneva 2013, 249–250).

5. The official English translation was changed in 2015 from the Ministry of Employment and the Economy (MEE) to the Ministry of Economic Affairs and Employment (MEAE).
6. However, the maximum price of €50/MWh promised to the owners of Fennovoima (Fennovoima 2013b) is much higher than the actual average prices on the Nord Pool market in the 2010s.
7. Comparing the Hungarian case to the ongoing British Hinkley Point project, Stephen Thomas of the University of Greenwich estimated that Paks would be built essentially cheaper than its British counterpart: €5200 per KWh against Hinkley's €7000 (Index 2015). The Russian loan would be beneficial for the Hungarians: 3.95–4.95% compared to the British project at 9.75–10.25%. However, János Tóth István pointed out that there is often room for corruption as costs of nuclear power plants seldom remain within their budgets (2015).

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the Academy of Finland Centre of Excellence on 'Choices of Russian Modernisation' (2012–17) and the Strategic Research Council consortium 'Transition to a Resource Efficient and Climate Neutral Electricity System (EL-TRAN) (2015–17)' [grant number 293437].

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